UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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*Ex parte* LINDSEY H. HALL
and SCOTT R. SUMMERFELT

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Appeal No. 2006-0375
Application 10/447,581

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ON BRIEF

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Before KIMLIN, PAK and WARREN, *Administrative Patent Judges.*

WARREN, *Administrative Patent Judge.*

*Decision on Appeal and Opinion*

We have carefully considered the record in this appeal under 35 U.S.C. § 134, and based on our review, find that we cannot sustain the grounds of rejection advanced on appeal: claims 1 through 6, 12 and 14 through 16 under 35 U.S.C. § 102(b) as anticipated by Moise et al. (Moise) (answer, pages 4-5); claims 7 and 13 under 35 U.S.C. § 103(a) as being obvious over Moise in view of Beintner et al. (answer, pages 5); claims 8 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Moise in view of Kato et al. (answer, pages 5-6); and claims 8 through 11 under 35 U.S.C. § 103(a) as being unpatentable over Moise in view of Torek et al.[1]

We refer to the answer and to the brief[2] for a complete exposition of the positions

[1] Claims 17 through 32 are also of record and have been withdrawn from consideration by the examiner under 37 CFR § 1.142(b). Claims 1 through 32 are all of the claims in the application.
[2] We consider the brief filed July 12, 2005.

advanced by the examiner and appellants.

The plain language of independent claim 1, on which all other appealed claims depend, specifies a method comprising at least the steps of etching with any manner of fluorine-based plasma etchant, any manner of semiconductor wafer having thereon any manner of material stack having at least two layers, wherein the "top layer" is a so-called "hard mask" which can have more than one layer or surface, and rinsing the etched material stack with any manner of "a wet clean process." The transitional term "comprising" opens the claim to include any manner of additional process steps and reactants. *See generally*, *Exxon Chem. Pats., Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1555, 35 USPQ2d 1801, 1802 (Fed. Cir. 1995) ("The claimed composition is defined as comprising - meaning containing at least - five specific ingredients."); *In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) ("As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term 'comprises' permits the *inclusion* of other steps, elements, or materials."). The plain language of dependent claim 2, on which no other appealed claim depends, specifies that "said material stack is a ferroelectric capacitor." The plain language of dependent claims 3 through 15 further specifies different ingredients for the fluorine-based plasma etchant and different ingredients or conditions for the "wet clean" step, including the use of ingredients which provide a "wet etch" in claim 15. Dependent claim 16 further specifies that "a top surface of said hard mask layer comprises" at least "TiAlN."

On this record, we cannot agree with the examiner that "the two steps of etching and wet cleaning could be performed simultaneously" (answer, pages 6-7). Indeed, in the absence of evidence or scientific explanation to the contrary, it would reasonably appear that the performance of the "wet clean" step with the attendant presence of "wet clean" materials on the surface of the stack would preclude the charged particles formed in the plasma from knocking out atoms in the substrate by impact during plasma etching.[3]

We agree with appellants that Moise would not have described the claimed method to one skilled in this art within the meaning of 35 U.S.C. § 102(b), and would not have taught or suggested the claimed method to one of ordinary skill in this art within the meaning of 35 U.S.C.

§ 103(a). Indeed, none of the disclosures in Moise that teach the use of a fluorine-based plasma etch on which the examiner relies, is the *last* etch step of the last layer on a semiconductor wafer in the formation of an at least two layer material stack in which a hard mask is the top layer, or otherwise constitute a step of etching a completed material stack on a semiconductor wafer. *See* Moise, e.g., [0036] through [0040], [0063] through [0067], [0069], [0072] and [0088] through [0106]; **FIG. 2**, particularly **204** through **216**; **FIG. 3***b-c*; and **FIG. 4***a-h*.

On this record, we further agree with appellants that the secondary references coupled with the primary reference would not have resulted in the claimed method. Indeed, the examiner has relied on these references only "to teach removing contaminants from the wafer surface using other conventional wet cleaning solutions" (answer, pages 8-9).

Accordingly, in the absence of a *prima facie* case of anticipation and a *prima facie* case of obviousness, we reverse the grounds of rejection on appeal.

The examiner's decision is reversed.

*Other Issues*

A comparison of the appealed claims with such disclosure of Moise as that at, e.g., [0038] through [0040], [0069] and [0072], raises the issue with respect to § 103(a), whether one of ordinary skill in this art would have substituted a fluorine-based plasma etch for the wet etch process using fluorine or fluorine-chlorine chemistries followed by a wet clean step, which can also etch the substrate, to clean a semiconductor wafer having a material stack. *See B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996) ("When obviousness is based on a particular prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. [Citation omitted.] This suggestion or motivation need not be expressly stated. [Citation omitted.]"). However, this issue has not been considered on the record and should be addressed by the examiner upon further consideration of the appealed claims subsequent to the disposition of this appeal.

We agree with the examiner that the objection to the "Figure 3" filed September 14, 2004, and the accompanying amendment to page 8 of the specification, filed October 8, 2004, as

[3] *See, e.g.*, "plasma etching," *McGraw-Hill Dictionary of Scientific and Technical Terms* 1251

introducing new matter into the disclosure of the invention under 35 U.S.C. § 132, set forth in the final action mailed December 20, 2004, is a petitionable matter. Indeed, the examiner does not find, and neither do we, that this amendatory material is necessary to support the scope of the appealed claims and thus, the examiner's objection is not tantamount to a ground of rejection of the appealed claims under 35 U.S.C. § 112, first paragraph, written description requirement. *See* Manual of Patent Examining Procedure (MPEP) § 608.04(c) (8th ed., Rev. 2, May 2004, Rev. 3, August 2005).

(5th ed., Sybil P. Parker, ed., New York, McGraw-Hill, Inc. 1994).

*Reversed*

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| EDWARD C. KIMLIN<br>Administrative Patent Judge | ) | |
| CHUNG K. PAK<br>Administrative Patent Judge | ) | BOARD OF PATENT<br>APPEALS AND<br>INTERFERENCES |
| CHARLES F. WARREN<br>Administrative Patent Judge | ) | |

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